

Dordt College Engineering Department

EGR 363, Introduction to Communication Systems

Spring, 2014

2013-14 Catalog Data	A study of analog and digital communication systems performance and theory with applications in radio, satellite, telephone, computer networking, and radar systems. Topics include linear modulation (AM, SSB, etc.) exponential modulation (FM and PM), sampling theory, the discrete-time and discrete-frequency domains, and basic digital modulation methods such as m -ary PSK, DPSK, OFDM, etc. The topic of noise is considered at the most elementary level sufficient to distinguish the performance of various modulation methods in the presence of noise. Prerequisite: Engineering 220. (4 credit hours, offered in spring of even-numbered calendar years.)
Textbook	Proakis and Salehi, <i>Fundamentals of Communication Systems</i> , 2 nd ed., Pearson Prentice-Hall, 2014. ISBN 978-0-13-335485-0.
Instructor	Douglas F. De Boer, Professor of Engineering, http://homepages.dordt.edu/ddeboer Office Phone: 722-6245; Office location: SB237 (Office hours posted on homepage, or just call.) E-mail Douglas.DeBoer@Dordt.edu, Home Phone: seven-two-two-fourteen-fourteen, please call before 10 PM.
Course Objectives and Outcomes	<i>Creational Structure:</i> Students will be able to predict the performance of basic analog and digital communication systems in terms of bandwidth and signal-to-noise ratios using deterministic signal models. <i>Creational Development:</i> Students will understand the tradeoffs made when selecting a modulation method. Students will understand some of the standards used in broadcasting, and will study the historical development of one of these standards.
Prerequisites by topic	Calculus including techniques of integration, sequences, and series. Differential equations. Sinusoidal steady state analysis of RLC circuits.
Computer use	Matlab will be the supported development environment for writing algorithms. Students are encouraged (but not required) to use programs such as Mathcad or Matlab for homework solutions when appropriate.
courses@dordt	Assignments and most other course information for this course are available via "courses@dordt." To logon, go to http://courses.dordt.edu and use your Dordt College account username and password.
Academic Integrity	Students must do their own work. Students may discuss homework but may not show papers or files to each other outside of class. Detail on this policy can be found on the web at http://homepages.dordt.edu/ddeboer/S14/HWSTDS14.HTM#DYOW . See the section headed "Do Your Own Work." This policy applies to the whole course, not just homework.
Accommodations	Students who require assistance or accommodations based on the impact of a documented disability must contact Marliss Van Der Zwaag, the Coordinator of Services for Students with Disabilities, to access accommodations. Telephone 722-6490, e-mail Marliss.VanDerZwaag@Dordt.edu
Means of Evaluation	Homework (10%), Two Tests (25% each), Research Paper (15%), Final Exam (25%) For details, follow the link titled "grading policy" at http://homepages.dordt.edu/ddeboer .

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This class meets for four 50-minute periods per week,
Monday, Wednesday and Friday at noon in Room CL1318 and Thursday at 12:25 PM in SB235.

Dates				Class
1/15	1/16	1/17		Introduction—Basic Concepts <i>Text: Chapter 1, Chapter 2</i>
1/20	1/22	1/23	1/24	Signals and Systems—Fourier Series <i>Text: Chapter 2</i>
1/27	1/29	1/30	1/31	Signals and Systems—Fourier Transform <i>Text: Chapter 2</i>
2/03	2/05	2/06	2/07	Signals and Systems—Filters <i>Text: Chapter 2</i>
2/10	2/12	2/13		Signals and Systems—Power, Energy, Hilbert Transform <i>Text: Chapter 2</i>
No class Friday, 2/14, Reading Day.				
2/17	2/19	2/20	2/21	Linear Modulation—Types (DSB-SC, AM, SSB, VSB) and Properties <i>Text: Chapter 3</i>
2/24	2/26	2/27	2/28	Linear Modulation—Modulators and Demodulators, Multiplexing, FDM, Quadrature <i>Text: Chapter 3, Test on Friday</i>
Wed, 2/28 Test				
3/03	3/05	3/06	3/07	Superheterodyne Receiver <i>Text Chapter 3 and supplement</i>
No class 3/10 – 3/14, Sp. Brk.				
3/19	3/20	3/21		Exponential Modulation—FM, PM and Properties thereof <i>Text Chapter 4,</i>
No class Monday, 3/17, Sp. Brk.				
3/24	3/26	3/27	3/28	Exponential Modulation—Modulators and Demodulators. <i>Text Chapter 4</i>
3/31	4/02	4/03	4/04	Exponential Modulation—FM-Radio, Television Standards, AMPS cellular <i>Text Chapter 4</i>
4/07	4/09	4/10	4/11	Probability and Random Processes—Definitions and Basics <i>Text Chapter 5, Test on Friday</i>
Fri, 4/11 Test				
4/14	4/16	4/17	4/18	Probability and Random Variables—Gaussian and White Processes <i>Text Chapter 5</i>
4/21	4/23	4/24	4/25	Effect of Noise on Analog Communication Systems <i>Text Chapter 6</i>
4/28	4/30	5/01		Analog-to-Digital Conversion and the sampling theorem <i>Text Chapter 7</i>
No class Friday, 5/02, Reading Day.				
Wednesday, 5/02				Final exam, 1:15 – 3:15 p.m.

Note: Schedule may vary by up to two weeks in order to accommodate the dynamics of this particular offering of the class.